

107TH CONGRESS
1ST SESSION

H. R. 100

To establish and expand programs relating to science, mathematics,
engineering, and technology education, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 3, 2001

Mr. EHLERS (for himself, Mr. KOLBE, Mr. HORN, Mr. BACA, Mr. SANDLIN, Mr. CAMP, Mr. FILNER, and Mr. GIBBONS) introduced the following bill; which was referred to the Committee on Science, and in addition to the Committee on Education and the Workforce, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

To establish and expand programs relating to science, mathematics, engineering, and technology education, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “National Science Edu-
5 cation Act”.

6 **SEC. 2. FINDINGS.**

7 Congress finds the following:

1 (1) As concluded in the report of the Com-
2 mittee on Science of the House of Representatives,
3 “Unlocking Our Future Toward a New National
4 Science Policy”, which was adopted by the House of
5 Representatives, the United States must maintain
6 and improve its preeminent position in science and
7 technology in order to advance human under-
8 standing of the universe and all it contains, and to
9 improve the lives, health, and freedoms of all people.

10 (2) It is estimated that more than half of the
11 economic growth of the United States today results
12 directly from research and development in science
13 and technology. The most fundamental research is
14 responsible for investigating our perceived universe,
15 to extend our observations to the outer limits of
16 what our minds and methods can achieve, and to
17 seek answers to questions that have never been
18 asked before. Applied research continues the process
19 by applying the answers from basic science to the
20 problems faced by individuals, organizations, and
21 governments in the everyday activities that make our
22 lives more livable. The scientific-technological sector
23 of our economy, which has driven our recent eco-
24 nomic boom and led the United States to the longest

1 period of prosperity in history, is fueled by the work
2 and discoveries of the scientific community.

3 (3) The effectiveness of the United States in
4 maintaining this economic growth will be largely de-
5 termined by the intellectual capital of the United
6 States. Education is critical to developing this re-
7 source.

8 (4) The education program of the United States
9 needs to provide for 3 different kinds of intellectual
10 capital. First, it needs scientists, mathematicians,
11 and engineers to continue the research and develop-
12 ment that are central to the economic growth of the
13 United States. Second, it needs technologically pro-
14 ficient workers who are comfortable and capable
15 dealing with the demands of a science-based, high-
16 technology workplace. Last, it needs scientifically lit-
17 erate voters and consumers to make intelligent deci-
18 sions about public policy.

19 (5) Student performance on the recent Third
20 International Mathematics and Science Study high-
21 lights the shortcomings of current K–12 science and
22 mathematics education in the United States, par-
23 ticularly when compared to other countries. We must
24 expect more from our Nation’s educators and stu-
25 dents if we are to build on the accomplishments of

1 previous generations. New methods of teaching
2 science, mathematics, engineering, and technology
3 are required, as well as better curricula and im-
4 proved training of teachers.

5 (6) Science is more than a collection of facts,
6 theories, and results. It is a process of inquiry built
7 upon observations and data that leads to a way of
8 knowing and explaining in logically derived concepts
9 and theories. Mathematics is more than procedures
10 to be memorized. It is a field that requires rea-
11 soning, understanding, and making connections in
12 order to solve problems. Engineering is more than
13 just designing and building. It is the process of mak-
14 ing compromises to optimize design and assessing
15 risks so that designs and products best solve a given
16 problem. Technology is more than using computer
17 applications, the Internet, and programming. Tech-
18 nology is the innovation, change, or modification of
19 the natural environment, based on scientific, mathe-
20 matical, and engineering principles.

21 (7) Students should learn science primarily by
22 doing science. Science education ought to reflect the
23 scientific process and be object-oriented, experiment-
24 centered, and concept-based. Students should learn
25 mathematics with understanding that numeric sys-

1 tems have intrinsic properties that can represent ob-
2 jects and systems in real life, and can be applied in
3 solving problems. Engineering education should re-
4 flect the realities of real world design, and should in-
5 volve hands-on projects and require students to
6 make trade-offs based upon evidence. Students
7 should learn technology as both a tool to solve other
8 problems and as a process by which people adapt the
9 natural world to suit their own purposes. Computers
10 represent a particularly useful form of technology,
11 enabling students and teachers to acquire data,
12 model systems, visualize phenomena, communicate
13 and organize information, and collaborate with oth-
14 ers in powerful new ways. A background in the ba-
15 sics of information technology is essential for success
16 in the modern workplace and the modern world.

17 (8) Children are naturally curious and inquisi-
18 tive. To successfully tap into these innate qualities,
19 education in science, mathematics, engineering, and
20 technology must begin at an early age and continue
21 throughout the entire school experience.

22 (9) Teachers provide the essential connection
23 between students and the content they are learning.
24 Prospective teachers need to be identified and re-
25 cruited by presenting to them a career that is re-

1 spected by their peers, is financially and intellectu-
2 ally rewarding, contains sufficient opportunities for
3 advancement, and has continuing access to profes-
4 sional development.

5 (10) Teachers need to have incentives to remain
6 in the classroom and improve their practice, and
7 training of teachers is essential if the results are to
8 be good. Teachers need to be knowledgeable of their
9 content area, of their curriculum, of up-to-date re-
10 search in teaching and learning, and of techniques
11 that can be used to connect that information to their
12 students in their classroom.

13 **SEC. 3. ASSURANCE OF CONTINUED LOCAL CONTROL.**

14 Nothing in this Act may be construed to authorize
15 any department, agency, officer, or employee of the United
16 States to exercise any direction, supervision, or control
17 over the curriculum, program of instruction, administra-
18 tion, or personnel of any educational institution or school
19 system.

20 **SEC. 4. MASTER TEACHER GRANT PROGRAM.**

21 (a) PROGRAM AUTHORIZED.—The Director of the
22 National Science Foundation shall conduct a grant pro-
23 gram to make grants to a State or local educational agen-
24 cy, a private elementary or middle school, or a consortium

1 of any combination of those entities, for the purpose of
2 hiring a master teacher.

3 (b) ELIGIBILITY.—In order to be eligible to receive
4 a grant under this subsection, a State or local educational
5 agency, private elementary or middle school, or consortium
6 described in subsection (a) shall submit to the Director
7 a description of the relationship the master teacher will
8 have vis-a-vis other administrative and managerial staff
9 and the State and local educational agency, the ratio of
10 master teachers to other teachers, and the requirements
11 for a master teacher of the State or local educational agen-
12 cy or school, including certification requirements and job
13 responsibilities of the master teacher. The description of
14 job responsibilities must include a discussion of any re-
15 sponsibility the master teacher will have for—

16 (1) development or implementation of science,
17 mathematics, engineering, or technology curricula;

18 (2) in-classroom assistance;

19 (3) authority over hands-on inquiry materials,
20 equipment, and supplies;

21 (4) mentoring other teachers or fulfilling any
22 leadership role; and

23 (5) professional development, including training
24 other master teachers or other teachers, or devel-

1 oping or implementing professional development pro-
2 grams.

3 (c) ASSESSMENT OF EFFECTIVENESS.—The Director
4 shall assess the effectiveness of activities carried out under
5 this section.

6 (d) FUNDS.—

7 (1) SOURCE.—Grants shall be made under this
8 section out of funds available for the National
9 Science Foundation for education and human re-
10 sources activities.

11 (2) AUTHORIZATION.—There are authorized to
12 be appropriated to the National Science Foundation
13 to carry out this section \$50,000,000 for each of fis-
14 cal years 2002 through 2004.

15 **SEC. 5. DISSEMINATION OF INFORMATION ON REQUIRED**
16 **COURSE OF STUDY FOR CAREERS IN**
17 **SCIENCE, MATHEMATICS, ENGINEERING, AND**
18 **TECHNOLOGY EDUCATION.**

19 (a) IN GENERAL.—The Director of the National
20 Science Foundation shall, jointly with the Secretary of
21 Education, compile and disseminate information (includ-
22 ing through outreach, school counselor education, and vis-
23 iting speakers) regarding—

24 (1) typical standard prerequisites for middle
25 school and high school students who seek to enter a

1 course of study at an institution of higher education
2 in science, mathematics, engineering, or technology
3 education for purposes of teaching in an elementary
4 or secondary school; and

5 (2) the licensing requirements in each State for
6 science, mathematics, engineering, or technology ele-
7 mentary or secondary school teachers.

8 (b) AUTHORIZATION OF APPROPRIATIONS.—There
9 are authorized to be appropriated for the National Science
10 Foundation to carry out this section \$5,000,000 for each
11 of fiscal years 2002 through 2004.

12 **SEC. 6. REQUIREMENT TO CONDUCT STUDY EVALUATION.**

13 (a) STUDY REQUIRED.—The Director of the National
14 Science Foundation shall enter into an agreement with the
15 National Academies of Sciences and Engineering under
16 which the Academies shall review existing studies on the
17 effectiveness of technology in the classroom on learning
18 and student performance, using various measures of learn-
19 ing and teaching outcome including standardized tests of
20 student achievement, and explore the feasibility of one or
21 more methodological frameworks to be used in evaluations
22 of technologies that have different purposes and are used
23 by schools and school systems with diverse educational
24 goals. The study evaluation shall include, to the extent
25 available, information on the type of technology used in

1 each classroom, the reason that such technology works,
2 and the teacher training that is conducted in conjunction
3 with the technology.

4 (b) DEADLINE FOR COMPLETION.—The study eval-
5 uation required by subsection (a) shall be completed not
6 later than one year after the date of the enactment of this
7 Act.

8 (c) DEFINITION OF TECHNOLOGY.—In this section,
9 the term “technology” has the meaning given that term
10 in section 3113(11) of the Elementary and Secondary
11 Education Act of 1965 (20 U.S.C. 6813(11)).

12 (d) AUTHORIZATION OF APPROPRIATIONS.—There
13 are authorized to be appropriated to the National Science
14 Foundation for the purpose of conducting the study eval-
15 uation required by subsection (a), \$600,000.

16 **SEC. 7. TEACHER TECHNOLOGY PROFESSIONAL DEVELOP-**
17 **MENT.**

18 (a) IN GENERAL.—The Director of the National
19 Science Foundation shall establish a grant program under
20 which grants may be made to a State or local educational
21 agency, a private elementary or middle school, or a consor-
22 tium consisting of any combination of those entities for
23 instruction of teachers for grades kindergarten through
24 the 12th grade on the use of information technology in

1 the classroom. Grants awarded under this section shall be
2 used for training teachers to use—

3 (1) classroom technology, including hardware,
4 software, communications technologies, and labora-
5 tory equipment; or

6 (2) specific technology for science, mathematics,
7 engineering or technology instruction, including data
8 acquisition, modeling, visualization, simulation, and
9 numerical analysis.

10 (b) AUTHORIZATION OF APPROPRIATIONS.—There
11 are authorized to be appropriated for the National Science
12 Foundation to carry out this section \$10,000,000 for each
13 of fiscal years 2002 through 2004.

14 **SEC. 8. SCIENCE, MATHEMATICS, ENGINEERING, AND**
15 **TECHNOLOGY BUSINESS EDUCATION CON-**
16 **ERENCE.**

17 (a) IN GENERAL.—Not later than 180 days after the
18 date of the enactment of this Act, the Director of the Na-
19 tional Science Foundation shall convene the first of an an-
20 nual 3- to 5-day conference for kindergarten through the
21 12th grade science, mathematics, engineering, and tech-
22 nology education stakeholders, including—

23 (1) representatives from Federal, State, and
24 local governments, private industries, private busi-
25 nesses, and professional organizations;

- 1 (2) educators;
- 2 (3) science, mathematics, engineering, and tech-
- 3 nology educational resource providers;
- 4 (4) students; and
- 5 (5) any other stakeholders the Director deter-
- 6 mines would provide useful participation in the con-
- 7 ference.

8 (b) PURPOSES.—The purposes of the conference con-

9 vened under subsection (a) shall be to—

- 10 (1) identify and gather information on existing
- 11 science, mathematics, engineering, and technology
- 12 education programs and resource providers, includ-
- 13 ing information on distribution, partners, cost as-
- 14 sessment, and derivation;

- 15 (2) determine the extent of any existing coordi-
- 16 nation between providers of curricular activities, ini-
- 17 tiatives, and units; and

- 18 (3) identify the common goals and differences
- 19 among the participants at the conference.

20 (c) REPORT AND PUBLICATION.—At the conclusion

21 of the conference the Director of the National Science

22 Foundation shall—

- 23 (1) transmit to the Committee on Science of the
- 24 House of Representatives and to the Committee on
- 25 Commerce, Science, and Transportation of the Sen-

1 ate a report on the outcome and conclusions of the
2 conference, including an inventory of curricular ac-
3 tivities, initiatives, and units, the content of the con-
4 ference, and strategies developed that will support
5 partnerships and leverage resources; and

6 (2) ensure that a similar report is published
7 and distributed as widely as possible to stakeholders
8 in science, mathematics, engineering, and technology
9 education.

10 (d) AUTHORIZATION OF APPROPRIATIONS.—There
11 are authorized to be appropriated for the National Science
12 Foundation to carry out this section—

13 (1) \$300,000 for fiscal year 2002; and

14 (2) \$200,000 for each of fiscal years 2003 and
15 2004.

16 **SEC. 9. GRANTS FOR DISTANCE LEARNING.**

17 (a) IN GENERAL.—The Director of the National
18 Science Foundation may make competitive, merit-based
19 awards to develop partnerships for distance learning of
20 science, mathematics, engineering, and technology edu-
21 cation to a State or local educational agency or to a pri-
22 vate elementary, middle, or secondary school, under any
23 grant program administered by the Director using funds
24 appropriated to the National Science Foundation for ac-
25 tivities in which distance learning is integrated into the

1 education process in grades kindergarten through the 12th
2 grade.

3 (b) AUTHORIZATION OF APPROPRIATIONS.—There
4 are authorized to be appropriated for the National Science
5 Foundation to carry out this section \$5,000,000 for each
6 of fiscal years 2002 through 2004.

7 **SEC. 10. SCHOLARSHIPS TO PARTICIPATE IN CERTAIN RE-**
8 **SEARCH ACTIVITIES.**

9 (a) IN GENERAL.—The President, acting through the
10 National Science Foundation, shall provide scholarships to
11 teachers at public and private schools in grades kinder-
12 garten through the 12th grade in order that such teachers
13 may participate in research programs conducted at private
14 entities or Federal or State government agencies. The pur-
15 pose of such scholarships shall be to provide teachers with
16 an opportunity to expand their knowledge of science,
17 mathematics, engineering, technology, and research tech-
18 niques.

19 (b) REQUIREMENTS.—In order to be eligible to re-
20 ceive a scholarship under this section, a teacher described
21 in subsection (a) shall be required to develop, in conjunc-
22 tion with the private entity or government agency at which
23 the teacher will be participating in a research program,
24 a proposal to be submitted to the President describing the
25 types of research activities involved.

1 (c) PERIOD OF PROGRAM.—Participation in a re-
 2 search program in accordance with this section may be
 3 for a period of one academic year or two sequential sum-
 4 mers.

5 (d) USE OF FUNDS.—The Director may only use
 6 funds for purposes of this section for salaries of scholar-
 7 ship recipients, administrative expenses (including infor-
 8 mation dissemination, direct mailing, advertising, and di-
 9 rect staff costs for coordination and accounting services),
 10 expenses for conducting an orientation program, reloca-
 11 tion expenses, and the expenses of conducting final selec-
 12 tion interviews.

13 (e) AUTHORIZATION OF APPROPRIATIONS.—There
 14 are authorized to be appropriated for the National Science
 15 Foundation to carry out this section \$5,000,000 for each
 16 of fiscal years 2002 through 2004.

17 **SEC. 11. INTERAGENCY COORDINATION OF SCIENCE EDU-**
 18 **CATION PROGRAMS.**

19 (a) INTERAGENCY COORDINATION COMMITTEE.—

20 (1) ESTABLISHMENT.—The Director of the Of-
 21 fice of Science and Technology Policy shall establish
 22 an interagency committee to coordinate Federal pro-
 23 grams in support of science and mathematics edu-
 24 cation at the elementary and secondary level.

1 (2) MEMBERSHIP.—The membership of the
2 committee shall consist of the heads, or designees, of
3 the National Science Foundation, the Department of
4 Energy, the National Aeronautics and Space Admin-
5 istration, the Department of Education, and other
6 Federal departments and agencies that have pro-
7 grams directed toward support of elementary and
8 secondary science and mathematics education.

9 (3) FUNCTIONS.—The committee shall—

10 (A) prepare a catalog of Federal research,
11 development, demonstration and other pro-
12 grams designed to improve elementary and sec-
13 ondary science or mathematics education, in-
14 cluding for each program a summary of its
15 goals and the kinds of activities supported, a
16 summary of accomplishments (including evi-
17 dence of effectiveness in improving student
18 learning), the funding level, and, for grant pro-
19 grams, the eligibility requirements and the se-
20 lection process for awards;

21 (B) review the programs identified under
22 subparagraph (A) in order to—

23 (i) determine the relative funding lev-
24 els among support for—

1 (I) teacher professional develop-
2 ment;

3 (II) curricular materials;

4 (III) improved classroom teach-
5 ing practices;

6 (IV) applications of computers
7 and related information technologies;
8 and

9 (V) other major categories of ac-
10 tivities;

11 (ii) assess whether the balance among
12 kinds of activities as determined under
13 clause (i) is appropriate and whether un-
14 necessary duplication or overlap among
15 programs exists;

16 (iii) assess the degree to which the
17 programs assist the efforts of State and
18 local school systems to implement stand-
19 ards-based reform of science and mathe-
20 matics education, and group the programs
21 in the categories of high, moderate, and
22 low relevance for assisting standards-based
23 reform;

24 (iv) for grant programs, identify ways
25 to simplify the application procedures and

1 requirements and to achieve greater con-
2 formity among the procedures and require-
3 ments of the agencies; and

4 (v) evaluate the adequacy of the as-
5 sessment procedures used by the depart-
6 ments and agencies to determine whether
7 the goals and objectives of programs are
8 being achieved, and identify the best prac-
9 tices identified from the evaluation for as-
10 sessment of program effectiveness; and

11 (C) monitor the implementation of the plan
12 developed under subsection (c) and provide to
13 the Director of the Office of Science and Tech-
14 nology Policy its findings and recommendations
15 for modifications to that plan.

16 (b) EXTERNAL REVIEW.—The Director of the Na-
17 tional Science Foundation shall enter into an agreement
18 with the National Research Council to conduct an inde-
19 pendent review of programs as described in subsection
20 (a)(3)(B) and to develop findings and recommendations.
21 The findings and recommendations from the National Re-
22 search Council review of programs shall be reported to the
23 Director of the Office of Science and Technology Policy
24 and to the Congress.

25 (c) EDUCATION PLAN.—

1 (1) PLAN CONTENTS.—On the basis of the find-
2 ings of the review carried out in accordance with
3 subsection (a)(3)(B) and taking into consideration
4 the findings and recommendations of the National
5 Research Council in accordance with subsection (b),
6 the Director of the Office of Science and Technology
7 Policy shall prepare a plan for Federal elementary
8 and secondary science and mathematics education
9 programs which shall include—

10 (A) a strategy to increase the effectiveness
11 of Federal programs to assist the efforts of
12 State and local school systems to implement
13 standards-based reform of elementary and sec-
14 ondary science and mathematics education;

15 (B) a coordinated approach for identifying
16 best practices for the use of computers and re-
17 lated information technologies in classroom in-
18 struction;

19 (C) the recommended balance for Federal
20 resource allocation among the major types of
21 activities supported, including projected funding
22 allocations for each major activity broken out
23 by department and agency;

24 (D) identification of effective Federal pro-
25 grams that have made measurable contributions

1 to achieving standards-based science and math-
2 ematics education reform;

3 (E) recommendations to the departments
4 and agencies for actions needed to increase uni-
5 formity across the Federal Government for ap-
6 plication procedures and requirements for grant
7 awards for support of elementary and secondary
8 science and mathematics education; and

9 (F) dissemination procedures for repli-
10 cating results from effective programs, particu-
11 larly best practices for classroom instruction.

12 (2) CONSULTATION.—The Director shall con-
13 sult with academic, State, industry, and other appro-
14 priate entities engaged in efforts to reform science
15 and mathematics education as necessary and appro-
16 priate for preparing the plan under paragraph (1).

17 (d) REPORTS.—

18 (1) INITIAL REPORT.—The Director of the Of-
19 fice of Science and Technology Policy shall submit
20 to the Congress, not later than 1 year after the date
21 of the enactment of this Act, a report which—

22 (A) includes the plan described in sub-
23 section (c)(1);

24 (B) in accordance with subsection
25 (c)(1)(C), describes, for each department and

1 agency represented on the committee estab-
2 lished under subsection (a)(1), appropriate lev-
3 els of Federal funding;

4 (C) includes the catalog prepared under
5 subsection (a)(3)(A);

6 (D) includes the findings from the review
7 required under subsection (a)(3)(B)(iii);

8 (E) includes the findings and recommenda-
9 tions of the National Research Council devel-
10 oped under subsection (b); and

11 (F) describes the procedures used by each
12 department and agency represented on the com-
13 mittee to assess the effectiveness of its edu-
14 cation programs.

15 (2) ANNUAL UPDATES.—The Director of the
16 Office of Science and Technology Policy shall submit
17 to the Congress an annual update, at the time of the
18 President’s annual budget request, of the report sub-
19 mitted under paragraph (1), which shall include, for
20 each department and agency represented on the
21 committee, appropriate levels of Federal funding for
22 the fiscal year during which the report is submitted
23 and the levels proposed for the fiscal year with re-
24 spect to which the budget submission applies.

1 **SEC. 12. DEFINITIONS.**

2 In this Act:

3 (1) The terms “local educational agency” and
4 “State educational agency” have the meanings given
5 such terms in section 14101 of the Elementary and
6 Secondary Education Act of 1965 (20 U.S.C. 8801).

7 (2) The term “institution of higher education”
8 has the meaning given that term by section 101 of
9 the Higher Education Act of 1965 (20 U.S.C.
10 1001).

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